1867MNRAS..27..238S

lengthened. But when care is taken to avoid any constraint upon the adjusting apparatus of the eye, by the instrumental adjustment being at first rather too long than too short, the eye will quietly accommodate itself, and may work on delicate and difficult objects for many hours together without conscious fatigue; and may continue its efforts from time to time, as from experience I can testify, for half a century with scarcely any perceptible deterioration.

Motion of the Solar System in Space. By E. J. Stone, Esq.

In vol. xxviii of the *Memoirs* of the Society will be found a paper by the Astronomer Royal on the motion of the Solar System in space. The method proposed for the treatment of the subject was new, inasmuch as no *à priori* assumption was made of an approximate position of the apex of the Sun's motion. The method was in this Memoir applied to the discussion of the proper motions of 113 stars. The investigation was afterwards calculated to the discussion of the proper motions of 1167 stars. The calculations for this investigation were made in duplicate at the Royal Observatory. The numbers to which I shall in the present paper refer are extracted from the books of calculation. The direct results of this investigation were presented to the Society in a paper drawn up by Mr. Dunkin, *Memoirs*, vol. xxxii. The resulting position of the apex of solar motion was in agreement with the results of previous investigations; the velocity of solar motion was in fair agreement with the result obtained by Professor Otto Struve. The sum of the squares of the proper motions in parallax and N.P.D. were, however, scarcely diminished by the application of the corrections arising from the supposed solar motion. The comparison, therefore, of the squares of the corrected proper motions and the uncorrected proper motions gave but little evidence in favour of the hypothesis of the motion of the Solar System in space. It has appeared to me that some information for or against the hypothesis of a solar motion in space might be very simply obtained by considering the agreement or disagreement in sign between the proper motions in parallax and N.P.D. and the computed parallactic effects of the assumed solar motion. In this way of looking at the question we are free from any error in the magnitude of the assumed solar motion. The number of stars whose proper motions are discussed in the Greenwich investigation is 1167. If there should be no truth whatever in the assumed proper motion in the Solar System in space, we might expect $\frac{1167}{4}$, or 291 cases, in which the observed proper motions and the computed effects of parallactic displacement would have the same signs in both elements. On an inspection of the books of calculation I find

Downloaded from http://mnras.oxfordjournals.org/ at University of Georgia on June 20, 2015

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System

1867MNRAS..27..239S

that we have 523 such cases of agreement. The excess of 523 above 291 or 232 would appear, therefore, to be the number of cases in which the direction of the proper motion in quadrant has been determined by the effect of the parallactic displacement due to the motion of the Solar System in space. This number is, I should consider, quite sufficient to prove the reality of the assumed solar motion in space. If from 1167 we subtract the probable number of cases of unforced agreement, viz. 291, we have 876 cases remaining. If the effect of the parallactic displacement was as often greater as less than the absolute proper motion, we should have had 138 cases of forced agreement out of these 876 cases, or 729 favourable cases in all. We have, however, only 523 such favourable cases. The inference would appear to be that the effect of parallactic displacement is much oftener less than greater than the absolute proper motion. If the parallactic displacement is less than the absolute proper motion in the ratio of 3 to 4, we should have 219 forced cases out of 876. Our number of favourable cases would then be 510. This is about the number actually obtained. I consider, therefore, that without appealing to the mere agreement of different investigations in the position of the apex of solar motion we have from the results of the Greenwich investigations numerical evidence of the truth of the assumed solar motion in space. The effects of parallactic displacement arising from this motion appear, however, to be on the average much smaller than the independent proper motions of the stars.

Note on the Calculation of the Sun's Parallax from the Lunar Theory by P. A. Hansen. By E. J. Stone, Esq.

In the *Monthly Notices* of the Society, vol. xxiii. No. 8, and vol. xxiv. No. 1, will be found two papers by Professor Hansen, in which values of the Solar Parallax are deduced from the value of $\frac{a}{a_1}$ employed in the construction of his Lunar Tables. In the first paper the adopted value of $\frac{a}{a_1}$ is afterwards multiplied by 1·03573, the factor by which Professor Hansen found it necessary to multiply his computed value of the coefficient of parallactic inequality in order to make his theory agree with observation.

The value of $\frac{a}{a_1}$, thus corrected, is then multiplied by Hansen's constant of Lunar Parallax, 3419″·57. The value of the Solar Parallax thus deduced is 8″·97. The method pursued would appear equivalent to assuming that a is what is generally understood by the semi-axis major of the Lunar Orbit, that is, the semi-axis major, as deduced from the mean sidereal

Downloaded from http://mnras.oxfordjournals.org/ at University of Georgia on June 20, 2015

© Royal Astronomical Society • Provided by the NASA Astrophysics Data System